

KEY

Science 9 Final Exam Practice

Atoms & Elements

1. What do the following household hazardous symbols stand for?



Corrosive flammable explosive poison

2. Identify the following WHMIS symbols:



compressed gas

flammable

oxidizing

poisonous/infectious

immediate toxic effects



other toxic effects

poisonous/infectious

biohazardous

corrosive

reactive

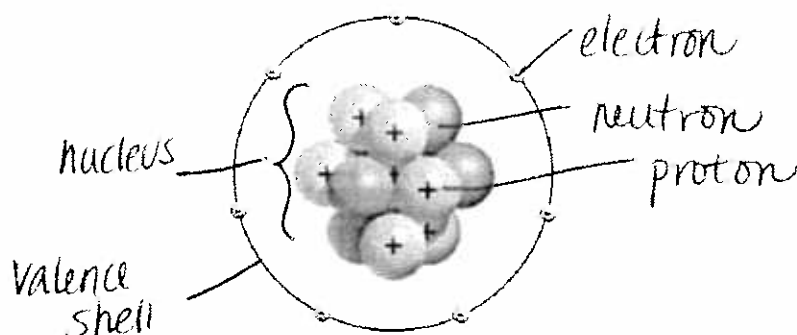
4. Are the following examples of a physical or chemical change? Explain why.

- a) Baking a cake P or C? cannot reverse; new substance
- b) Breaking a glass P or C? it's still glass; not a new substance
- c) Dissolving sugar in coffee P or C? can physically separate; not new subst.
- d) Cement drying P or C? cannot reverse; new substance

5. In each group below, three of the substances belong to the same category of matter (element, compound, mechanical mixture or solution) and one does not. Circle the substance that does not belong and list why it is different from the others.

- a) Sea water, kool-aid, sodium chloride, chlorine element others are solutions
- b) Bromine, gold, silver, salt compound others are elements
- c) Angel food cake, water compound others are mixtures mechanical

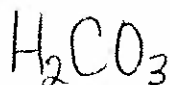
6. Label the nucleus, protons, neutrons, electrons and valence shell on the following diagram of an atom:



7. What is wrong with the following chemical symbols and formulas?

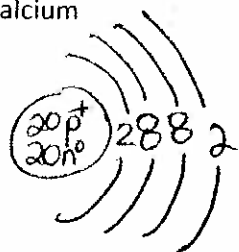
- a) ~~au~~ Au
 b) ~~Ag~~ Ag
 c) ~~Na₂SO₄~~ Na₂SO₄
 d) ~~MgCl₂~~ MgCl₂

8. Write the proper chemical formula for a compound that has 2 hydrogen, 1 carbon and 3 oxygen (in that order).

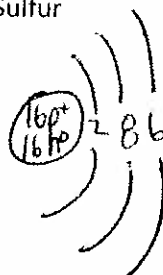


9. Draw the Bohr-Rutherford diagram for:

a) Calcium



b) Sulfur



10. Refer to the above diagrams for the following questions:

- a) What noble gas has the closest atomic number to Calcium and Sulfur?

Argon

- b) In order to make a stable ion, which of the above would lose an electron(s) and which would gain an electron(s)?

Calcium would lose / sulfur would gain

- c) How many would each lose/gain?

Ca lose $2e^-$ S gain $2e^-$

- d) What charge does a Calcium ion have?

Ca^{2+}

- e) What charge does a Sulfur ion have?

S^{2-}

11. Fill in the following table:

Atom/Ion/ Isotope	Atomic Mass	Atomic Number	Standard Atomic Notation	Number of protons	Number of electrons	Charge	Number of neutrons
atom	23	11	²³ ₁₁ Na	11	11	0	$23 - 11 = 12$
ion	35	17	³⁵ ₁₇ Cl ¹⁻	17	18	1-	$35 - 17 = 18$
isotope	90	38	⁹⁰ ₃₈ Sr	38	38	0	$90 - 38 = 52$

12. Match the following terms with their definition:

- 8 Qualitative observation
- 7 Quantitative observation
- 12 malleability
- 13 ductility
- 14 viscosity
- 11 luster
- 15 solid
- 17 liquid
- 16 gas
- 18 physical change
- 19 chemical change
- 21 evaporation
- 22 condensation
- 20 sublimation
- 23 solution
- 24 mechanical mixture
- 25 pure substance
- 4 proton
- 5 neutron
- 6 electron
- 1 atom
- 2 ion
- 3 isotope
- 9 period
- 10 group

- 1 A particle in an element. Has equal numbers of p⁺'s and e⁻'s
- 2 An atom that has gained or lost an electron.
- 3 An atom of the same element with a different number of n⁰'s
- 4 A particle in the nucleus of an atom with a positive charge.
- 5 A particle in the nucleus of an atom with no charge.
- 6 A particle circling the nucleus of an atom with a negative charge.
- 7 An observation that looks at measurements.
- 8 An observation that looks at visible properties (descriptions)
- 9 A row on the periodic table (left to right)
- 10 A column on the periodic table (up and down)
- 11 A physical property describing how shiny a substance is.
- 12 A physical property describing how bendable a substance is.
- 13 A physical property that allows a solid to be pulled into wires.
- 14 A physical property of a liquid that limits its ability to flow.
- 15 Matter that has a definite shape and takes up a definite amount of space.
- 16 Matter that does not have a definite shape and does not take up a definite amount of space.
- 17 Matter that does not have a definite shape but does take up a definite amount of space.
- 18 A change in where no new matter is created.
- 19 A change in where new matter is created.
- 20 A change in state from solid to gas or gas to solid.
- 21 A change in state from liquid to gas.
- 22 A change in state from gas to liquid.
- 23 A homogeneous mixture (looks the same throughout)
- 24 A mixture where you can see its different parts.
- 25 A substance that contains only one kind of particle.

Electricity

1. What are the 3 laws of electric charge?

- opposite charges attract

- like charges repel

- Charged objects attract neutral objects.

2. What are the 3 methods of charging an object?

• Charge by friction (rubbing)

• Charge by contact (touching)

• Charge by induction (no direct contact)

3. State whether the following are conductors, insulators or resistors:

a) Copper - Conductor

b) Salt water - conductor

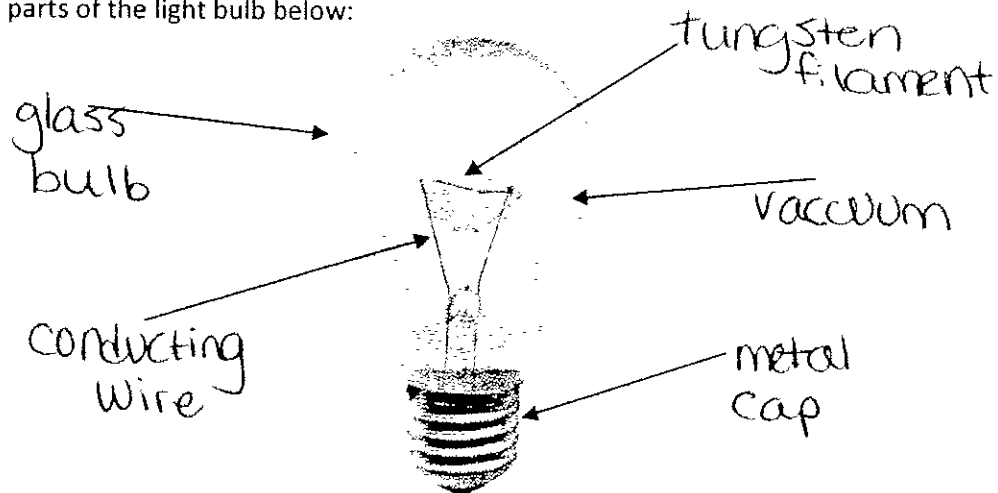
c) Rubber - insulator

d) Nichrome - resistor

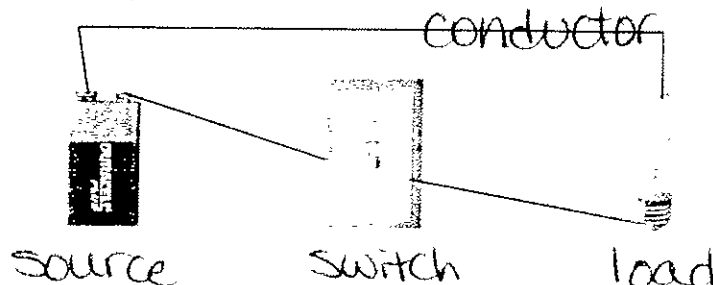
e) Tungsten - resistor

4. What has MORE resistance: a short thick wire or a long, thin wire?

5. Label the parts of the light bulb below:



6. Label the 4 components of an electrical circuit:



7. When comparing series and parallel circuits:

a) What is the difference in how they LOOK?

Series is one path / parallel has >1 path

b) What is the difference in the amount of current drawn from the cell when there are numerous light bulbs connected to the circuit?

Current is shared in series / more current is pulled from cell in parallel.

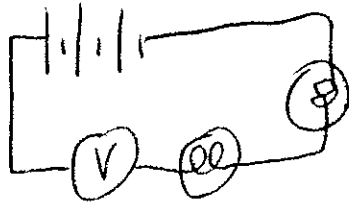
c) What is the difference in the brightness of bulbs when there are numerous light bulbs connected to the circuit?

bulbs are dimmer in series + brighter in parallel.

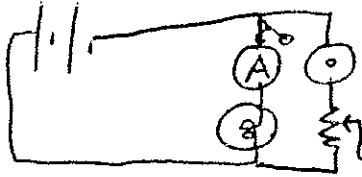
d) What happens if one light bulb is broken in each of the circuits?

Series won't work / parallel others will still work.

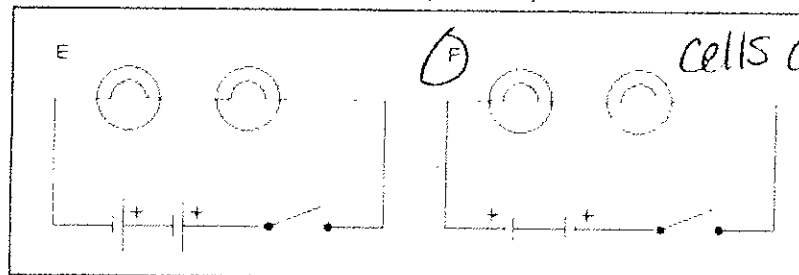
8. Draw a series circuit with 3 cells, a voltmeter, and 2 bulbs.



9. Draw a parallel circuit with 2 cells, a bulb and ammeter in one of the circuits and a variable resistor and a motor in the second circuit. Put in a switch that will only affect the bulb and ammeter.



10. Which of the diagrams below does NOT work? Explain why.



cells are not joined properly

11. Name 3 magnetic metals.

iron nickel cobalt

12. What is in the core of the earth that makes a compass point north?

iron & nickel - magnet so compass points toward magnet.

13. If you kept the light on in your room for 10 hours per week:

- a) Calculate the electrical energy used (in kW·h) if you had a regular incandescent light bulb. (power = 0.060 kW)

$$E = P \times T = (0.060 \text{ kW})(10 \text{ h}) = 0.60 \text{ kW} \cdot \text{h}$$

- b) If SaskPower's energy rate is 10.22 ¢/kW·h, calculate the cost for each bulb after one week.

$$0.60 \text{ kW} \cdot \text{h} \times \frac{10.22 \text{ ¢}}{\text{kW} \cdot \text{h}} = 6.132 \text{ ¢}$$

14. Match the following terms with their definition:

- 6 cell
- 7 battery
- 12 static electricity
- 11 current electricity
- 8 conductor
- 9 resistor
- 10 insulator
- 17 galvanometer
- 18 ammeter
- 16 primary cell
- 15 secondary cell
- 13 dry cell
- 14 wet cell
- 20 switch
- 2 open circuit
- 1 closed circuit
- 3 generator
- 4 motor
- 5 short circuit
- 19 voltmeter

- ~~1~~ A circuit where electricity is allowed to flow.
- ~~2~~ A circuit where electricity cannot flow; a break in the circuit.
- ~~3~~ A device that uses movement to create electricity.
- ~~4~~ A device that uses electricity to create movement.
- ~~5~~ A circuit that does not have a load to use the energy from the source. It is dangerous because it can overheat and cause a fire.
- ~~6~~ The source of electricity. It has an electrode and an electrolyte.
- ~~7~~ Two or more cells joined together.
- ~~8~~ A substance that allows electricity to flow through it.
- ~~9~~ A substance that does not allow electricity to flow through it.
- ~~10~~ A substance that slows the flow of electrons. (can cause heat or light)
- ~~11~~ Electricity where the electrons MOVE.
- ~~12~~ A build up of electric charge. Electricity where electrons DON'T move.
- ~~13~~ A cell that has a paste for its electrolyte.
- ~~14~~ A cell that has a liquid for its electrolyte.
- ~~15~~ A cell that is re-chargeable.
- ~~16~~ A cell that once used, is discharged and cannot be recharged.
- ~~17~~ A device that measures strong electric current.
- ~~18~~ A device that measure weak electric current.
- 19. A device that measures the "push" of electrons from the cell (voltage)
- 20. A device that turns on + off the circuit.

Reproduction

1. What are the 3 points of the cell theory?

1. All living things are made of ^{1 or more} cells
2. All cells come from pre-existing cells

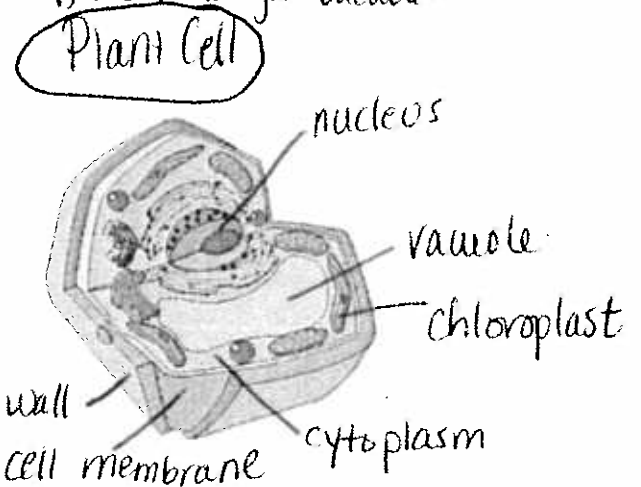
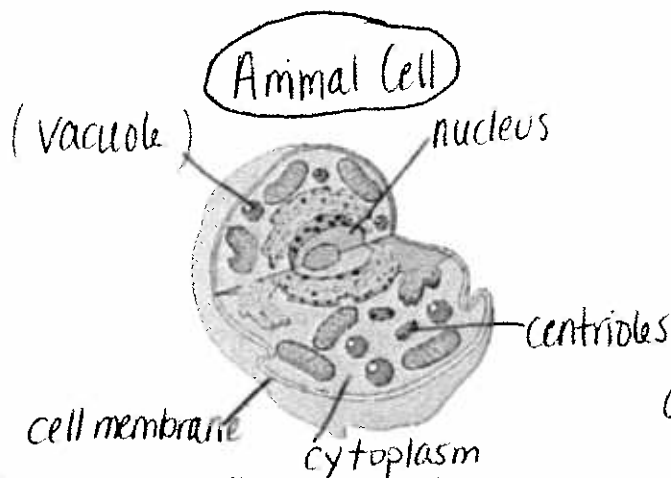
3. Cells are the basic unit of life.

2. a) Label the nucleus, cell membrane, cytoplasm, cell wall, centrioles, vacuoles and the chloroplast on the following two cells. (NOTE: some organelles may only be on one of the cells)

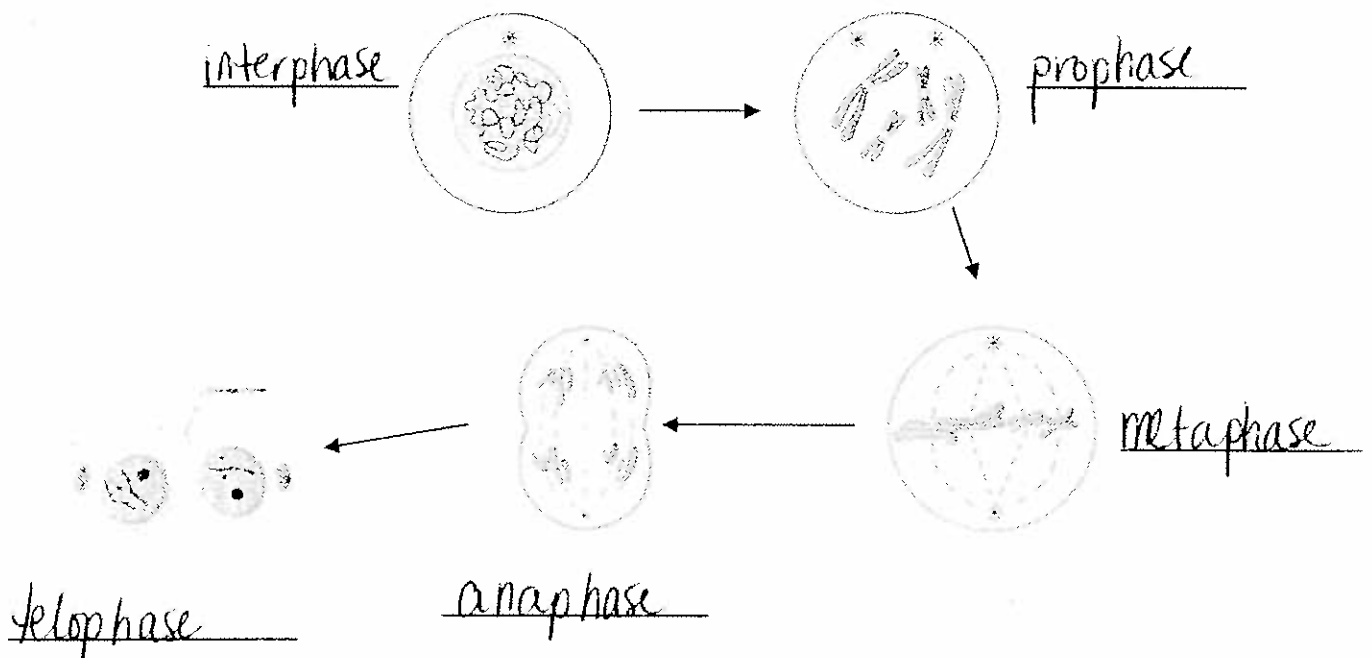
✓ b) Which is the plant cell and which is the animal cell?

c) List 3 differences between plant and animal cells.

- 1) Animal-round Plant-square
- 2) Animal-centrioles Plant-not
- 3) Plant chloroplast+cell wall
- 4) Plant larger vacuole. Animal-not



3. Label the different stages of mitosis



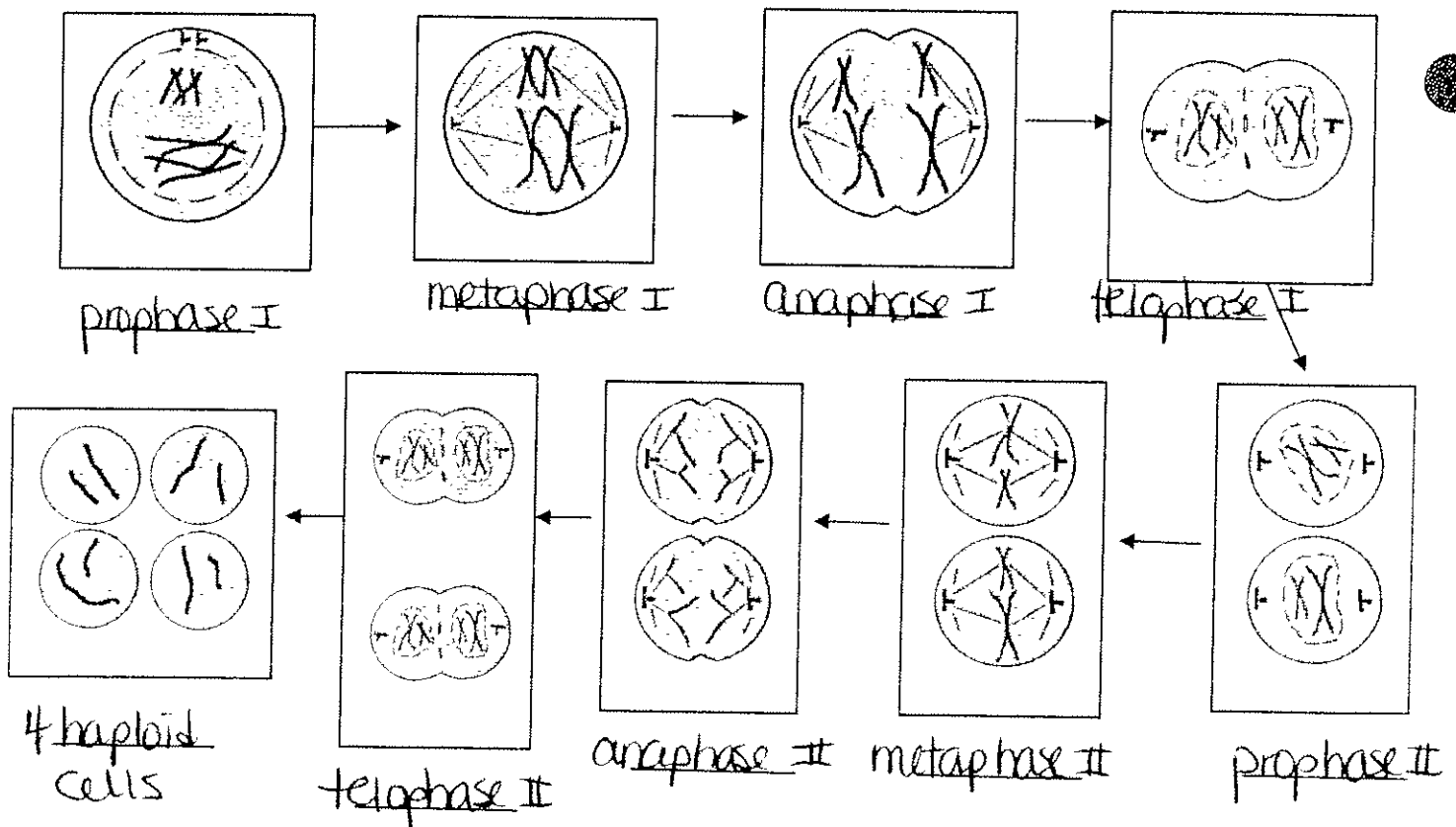
4. Briefly explain what happens at each stage in mitosis:

- Interphase - cell prepares for division; duplicates X'somes & grows
- Prophase - Chromosomes shorten & thicken
- Metaphase - X'somes line up in middle of cell (equator)
- Anaphase - 2 halves of X'somes pull to opposite sides
- Telophase - cytokinesis begins. Cell splits in 2.

5. The cell cycle includes mitosis and interphase. What 3 things happen during the "interphase" section of the cell cycle?

- ① rapid growth
- ② Duplication of X'somes
- ③ growth & preparation for cell division

6. Label the correct stages of meiosis in the following diagram:



7. What is the difference between anaphase I and anaphase II in meiosis?

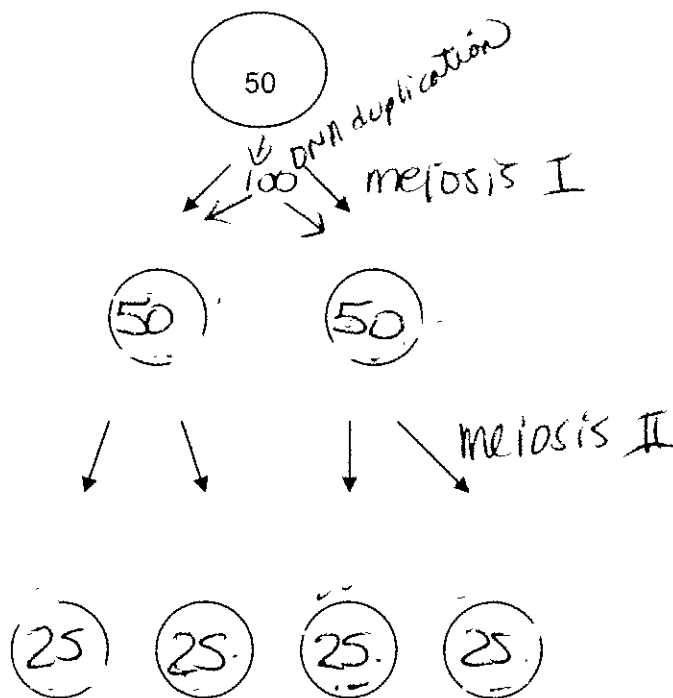
In anaphase I homologous pairs of chromosomes separate but in anaphase II sister chromatids separate.

8. What is the difference between telophase I and telophase II in meiosis?

1 cell divides into 2 cells in telophase I

2 cells divide into 4 haploid cells in telophase II

9. Fill in the number of chromosomes in the following meiosis process.



10. Compare and contrast asexual and sexual reproduction.

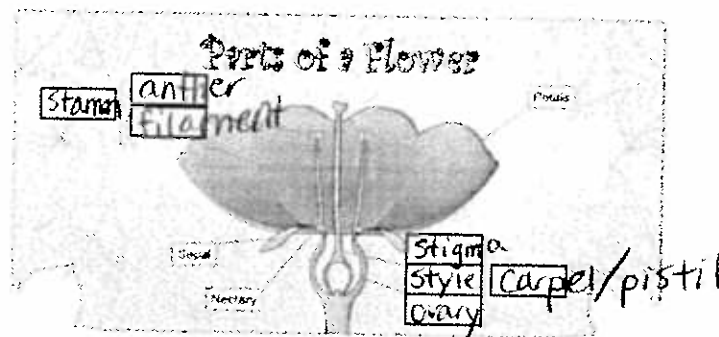
Asexual

- 1 parent
- identical offspring (clones)
- fast
- not good for adapting to environment (can't do better than parents).

Sexual

- 2 parents
- new genetic mix in offspring
- slow
- Can adapt to environment (new genetic variation)

11. Label the parts of the flower on the following diagram:



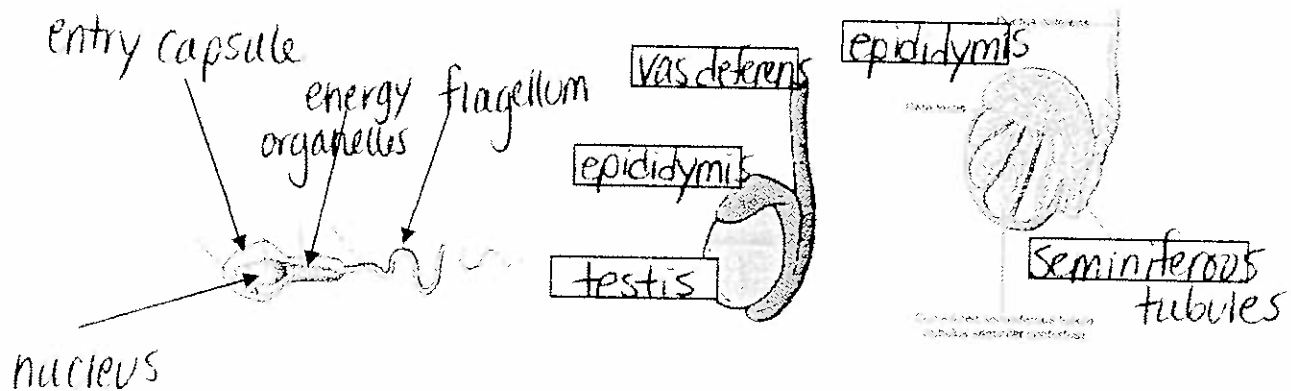
12. If a baby was born with a brown-eye allele from her mom and a blue-eye allele from her dad:

- What is the baby's genotype? Bb
- What is the baby's phenotype? *brown eyes*
- Which trait is dominant, *brown* or blue?
- Which trait is recessive, brown or *blue*?

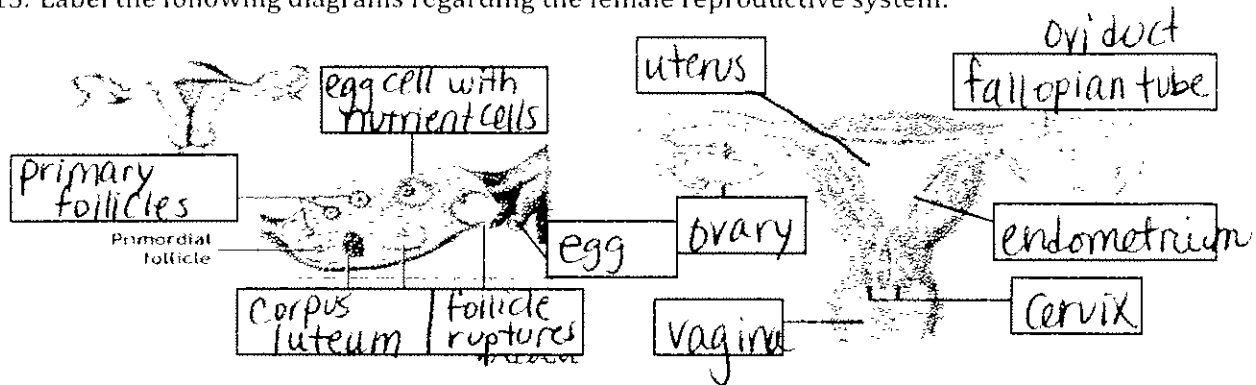
13. Hemophilia is a sex-linked trait. Look at the genotypes of the following people and list whether they have hemophilia, are a carrier of hemophilia or do not have hemophilia (& not a carrier). Also, list the sex of the person.

- X_hX female-carrier
- X_hY male-hemophilia
- X_hX_h female-hemophilia
- XY - male-ok
- XX - female-ok

14. Label the following diagrams regarding the male reproductive system:



15. Label the following diagrams regarding the female reproductive system:



16. Match the following human reproduction terms:

- | | | | |
|-------------------------|---------------------------|--------------------------|--|
| a Eggs | b ovaries | c uterus | d oviduct (fallopian tubes) |
| e sperm | f flagellum | g testes | h seminiferous tubules |
| i epididymis | j vas deferens | k follicle | l corpus luteum |
| m ovulation | n menstruation | o endometrium | p vagina |
| q zygote | r embryo | s fetus | |
-
- | | |
|--|---|
| <u>e</u> male reproductive cells | <u>l</u> nutrient cells that remain in the ovary |
| <u>a</u> female reproductive cells | <u>k</u> cells in the ovary that produce an egg |
| <u>g</u> primary male reproductive organ | <u>m</u> the process of releasing an egg |
| <u>b</u> primary female reproductive organ | <u>o</u> the thick lining of the uterus (where the embryo embeds) |
| <u>c</u> where the embryo develops and grows | <u>p</u> the birth canal |
| <u>d</u> where fertilization takes place | <u>q</u> the cell that forms when a sperm |
| <u>n</u> the process of shedding the endometrial cells | <u>r</u> fertilises an egg. unlike |
| <u>f</u> the tale of a sperm | <u>s</u> the organism 9 weeks after fertilization |
| <u>j</u> the tube where sperm is released from | <u>v</u> the dividing fertilized cell about 100 cells |
| <u>i</u> where sperm complete their development | |
| <u>h</u> the tiny twisting tubes lined with reproductive cells to make sperm | |

17. Match the following terms with their definitions:

- | | |
|-----------------------------------|--|
| <u>8</u> binary fission | 1 Having 2 sets of chromosomes (1 from mom and 1 from dad). |
| <u>9</u> budding | 2 Having half the complete set of chromosomes. |
| <u>11</u> regeneration | 3 A pair of chromosomes that carry genes for the same trait in the same position on the chromosome. |
| <u>10</u> spore formation | 4 The 2 halves of a duplicated chromosome (attached at the center) |
| <u>7</u> parthenogenesis | 5 A change in the genetic code (DNA) |
| <u>12</u> vegetative reproduction | 6 Uncontrolled cell growth. |
| <u>14</u> conjugation | 7 Where an unfertilized egg develops into an organism. |
| <u>13</u> hermaphrodite | 8 Where one organism splits into 2 equal sized offspring. |
| <u>15</u> pollination | 9 Where an offspring starts as a small outgrowth on the parent. |
| <u>16</u> spontaneous generation | 10 The organism undergoes frequent cell division to produce spores |
| <u>3</u> homologous chromosome | 11 A new organism is formed from a part broken off of the parent. |
| <u>4</u> sister chromatids | 12 Where new plants are formed through mitosis and growth. |
| <u>1</u> diploid | 13 An organism that has male and female sex cells. |
| <u>2</u> haploid | 14 Where 2 cells exchange small pieces of genetic material. |
| <u>6</u> cancer | 15 Where pollen is moved from anther to the eggs. |
| <u>5</u> mutation | 16 The theory where living organisms arise from non-living matter. |

Space

Match the following terms with their definitions:

- | | |
|--------------------------|--|
| <u>12</u> solar system | 1. A chunk of ice and dust that travels in a very long orbit around the sun |
| <u>13</u> star | 2. The high-density core left when a star about 30 times the mass of the sun dies |
| <u>11</u> planet | 3. A small rocky object |
| <u>14</u> sun | 4. A huge collection of gas, dust & hundreds of millions of stars & planets. |
| <u>5</u> gas giant | 5. Planet with an atmosphere that consists mostly of low-density gases H_2 & He |
| <u>3</u> asteroid | 6. A huge cloud of dust & gases in outer space; the beginning & ending of a star |
| <u>10</u> meteoroid | 7. The distance that light rays travel in one year. |
| <u>9</u> meteorite | 8. A bright streak of light across the sky caused by a meteoroid. |
| <u>8</u> meteor | 9. A meteoroid that reaches the ground. |
| <u>1</u> comet | 10. A lump of rock or metal trapped by Earth's gravity & pulled down through Earth's atmosphere. |
| <u>4</u> galaxy | 11. A large piece of matter, generally spherical, that revolves around a star. |
| <u>7</u> light year | 12. The sun and all the objects that travel around it (including planets & moons) |
| <u>15</u> sunspot | 13. A large collection of matter that emits huge amounts of energy. |
| <u>19</u> quasar | 14. The star around which Earth and 8 other planets revolve |
| <u>6</u> nebula | 15. A dark patch on the sun's photosphere |
| <u>16</u> red giant | 16. A star near the end of its life that becomes larger and redder |
| <u>17</u> red supergiant | 17. A star with a mass 10 times larger than the Sun's near the end of its life. |
| <u>18</u> white dwarf | 18. A small star created by the remaining material when a red giant dies. |
| <u>2</u> black hole | 19. An object that looks like a faint star but emits up to 100times more energy than our entire galaxy. |